

EPIDEMIOLOGY OF FATAL INJURIES IN ANDORRA SKI RESORTS



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INTRODUCTION

Epidemiology of ski and snowboard injuries in our area is now well known

Since 12 years ago we have studies based in a central database from ski patrols, resorts medical centers and the unique hospital

The studies conducted don't differ from what's found abroad

Until now we haven't analyzed what happens with mortality around snow sports

FATALITIES in SKI RESORTS

All around the world, hundreds of studies treat about snow sports safety and injuries in general

but the issue of mortality is less known, since there are some interesting studies that give us some interesting facts.



Epidemiology of fatal injuries in Andorra Ski Resorts

FATALITIES in SKI RESORTS

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Some facts

ORIGINAL ARTICLE

Downhill skiing injury fatalities among children

H Xiang, L Stallones, G A Smith

Injury Prevention 2004;10:99–102. doi: 10.1136/ip.2003.004655

- Traumatic brain injury was the leading cause of downhill skiing related fatal injuries among child skiers 7–17 years of age.
- Collisions, often with trees, were the leading external mechanism for downhill skiing related injuries for both child skiers and adult skiers.
- Effectiveness of ski helmets in preventing traumatic brain injuries among child skiers needs to be studied further.
- Lack of detailed exposure information (number of skiers and total skiing hours) is one of the major limitations.

Some facts

Downhill Ski Fatalities: The Vermont Experience

PAUL L. MORROW, M.D., ELEANOR N. McQUILLEN, M.D., LISLE A. EATON, JR., M.D., AND CHARLES J. BERNSTEIN, M.D.

- Predominance of traumatic brain injury as cause of death
- More males sustain fatal injuries
- High speed and collision are often involved

Some facts

A Review of Fatal Injuries Associated with Downhill Skiing

Suzanne C. Tough, M.Sc., and John C. Butt, M.D., F.R.C. Path.

“The individual most likely to die while downhill skiing is an experienced male skier, average age 31 years. He loses control while skiing too fast and strikes an object, resulting in fatal blunt trauma”

Some facts

Fatalities on Austrian Ski Slopes During a 5-year period

Gerhard Ruedl, PhD; Hanno Bilek, MA; Hans Ebner; Karl Gabl, PhD; Martin Kopp, PhD;
Martin Burtscher PhD, MD

- incidence of 0.79 deaths per million skier days
- 85% of all fatalities occurred in males and
- 93.1% in skiers.
- 52.7% were nontraumatic deaths, with the majority (73%) attributed to cardiac arrest.

- Regarding traumatic deaths, 41.2% died after a fall, 18.6% after collision with another skier, and 35.1% after an impact with a solid object.
- Head injury was the primary cause of death in 46.4% of traumatic deaths.

FATALITIES in SKI RESORTS

We decided to look closer to this issue

We examined coroner reports on fatalities occurred in andorran ski areas during 10 seasons (2003-2004 to 2013-2014)

Ski patrol and ski resorts medical center reports completed data about each case

Number of ski area users, were obtained from Ski Andorra, the association of Andorran ski areas

FATALITIES in SKI RESORTS

- From season 2003-2004 to 2013-2014 the Andorran ski areas had 27.930.000 skier/day
- 12 fatalities were registered in this period
 - 1 fatality every 2.33 million skier/day
(0.43 deaths per million skier days)
- of which only 8 were due to ski/snowboard accidents
 - 1 traumatic fatality every 3.49 million S/D
(0.3 deaths per million skier days)

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FATALITIES in SKI RESORTS

CIRCUMSTANCES

	date	time	age	gender	circumstances	
A	3/1/04	13H45	30	M	Slips, falls and breaks the icy surface on a reservoir	pedestrian
B	5/1/04	12H	15	M	Colision against a fence limiting the ski slope, high speed	ski
C	13/1/04	13H	37	M	Colision against a tree at the side of the slop, high speed	ski
D	6/2/04	12h30	37	M	Colision against a fence outside the slope, high speed	ski
E	3/1/08	11H30	43	M	Medical condition	ski
F	26/1/10	13H	14	F	Colision against a net limiting the ski slope, high speed	ski
G	13/3/10	16H30	62	M	Medical condition	ski
H	30/12/10	14H	44	M	Bad reception after a jump in a terrain park, high speed	ski
I	23/12/11	12H	54	M	Colision against a snow canon, high speed	seat ski
J	10/1/12	11H30	43	F	Colision against a snow canon, high speed	ski
K	30/3/12	14H25	57	F	Medical condition	pedestrian
L	26/12/13	15H	27	F	Caught by an avalanche, closed trail, late alert	snowboard

Epidemiology of fatal injuries in Andorra Ski Resorts

FATALITIES in SKI RESORTS

Causes of dead

	circumstances	Death cause
M30	Slips, falls and breaks the icy surface on a reservoir	drowning
M15	Colision against a fence limiting the ski slope, high speed	TCE skull base fracture
M37	Colision against a tree at the side of the slop, high speed	TCE skull base fracture
M37	Colision against a fence outside the slope, high speed	TCE brain injury
M43	Medical condition	sudden cardiac death (massive myocardial infarction)
F14	Colision against a net limiting the ski slope, high speed	Cervical vertebrae fractures C1-C2 section of spinal chord
M62	Medical condition	Sudden cardiac death (massive myocardial infarction)
M44	Bad reception after a jump in a terrain park, high speed	Pelvic fractures – low back fractures
M54	Colision against a snow canon, high speed	Blunt abdominal trauma
F43	Colision against a snow canon, high speed	Massive hemothorax, Brain injuries
F57	Medical condition	Cerebral hemorrhage
F27	Caught by an avalanche, closed trail, late alert	hypothermia

Epidemiology of fatal injuries in Andorra Ski Resorts

FATALITIES outside SKI RESORTS

17/3/06	36	Avalanche	Asphyxia / chest compression	Arinsal
27/1/07	37	Avalanche	precipitació	Pic de la Mine
10/3/09	38	Avalanche	Asphyxia / chest compression	Comapedrosa
10/3/09	44	Avalanche	Asphyxia / chest compression	Comapedrosa
10/2/10	33	Avalanche	Hypothermy	Pic de la Serrera
16/3/13	37	Avalanche	Severe head injuries	Pic de la Serrera
11/1/14	39	Colision with snow groomer winch cable	Asphyxia/upper airways trauma	Arinsal Ski resort

RESULTS

- out of 12 deaths 3 were caused by medical conditions, 1 was a working accident not related with snow sports
- out of the 8 snowsports related deaths:
 - 6 males / 2 females
 - 6 involved high speed + collision / 1 high speed + jump
- only 1 death was caused by an avalanche (compared to 6/7 back country skiers dead in the same period)

DISCUSSION

- the study shows a very low rate of fatalities in our ski areas:
 - maybe some delayed deaths are unregistered (transfert to other hospitals for neurosurgery)?
 - less risk-taking behaviour than in other countries?

- Snow sports in controlled ski areas are far more safe than back country skiing

DISCUSSION

- the causes of death of our cases suggests that protective measures (helmets, cannon protections...) could be ineffective for high speed collisions



CONCLUSION

Death is a rare event in snowsports in Andorran ski resorts, but must be kept in mind to promote safer behaviour and the respect of **safety rules**.

Studies must help us to find the best prevention strategy.

Thank you!

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